

II. The Claim Amendments

Claims 1 and 22 are being amended to recite that the inner and outer conductors are "electrically unconnected". Claim 30 has been amended to recite that the inner and outer conductors of the first and second respective coaxial cable units are electrically unconnected. Claim 33, dependent on Claim 30, has been similarly amended with respect to the inner and outer conductors of a third coaxial cable unit. While being unconnected electrically, the inner and outer conductors are inductively coupled, as originally claimed.

The Figures of the application show that there is no electrical connection between the inner and outer conductors of the coaxial cable units. The inner and outer conductors are not connected by a wire or by any circuit component such as a capacitor or an inductor, as shown in Figures.

Claims 1, 61 and 70 have been amended to remove the limitation that the coaxial cable unit defines a region for receiving a body part, which is not needed.

Claim 61 has also been amended to correct a typographical error to recite that the first inner conductor and the first outer conductor are inductively coupled during operation, as is the second inner outer conductors in claim 61 and the other claims, as was originally intended and is clear from the specification. The amendment is not being made in response to a patentability rejection and the scope of the claim is not being narrowed.

Claim 70 has also been amended to clarify the inductive coupling between the first, second and third conductors, as discussed on pages 23, line 22 – page 34, line 8. The amendment is not being made for the purpose of patentability and the scope of the claim is not being narrowed.

III. The Final Rejection

Claims 1-18, 22-26, 30-36, 61-70 and 86 have been rejected for obviousness-type double patenting. The rejection has been made final.

It is respectfully submitted that a Final Rejection is improper at this time because no Office Action has been issued with respect to the patentability of the claims in light of the prior art.

In the first Office Action dated January 3, 2002, a Restriction Requirement was given. The Applicant responded in an Amendment filed on March 7, 2002, in which claims were elected and the Restriction Requirement traversed. In a second Office Action dated May 15, 2002, the Restriction Requirement was made Final. The elected claims were rejected under 35 U.S.C. § 101 for statutory double patenting in light of the claims of commonly owned Application Number 09/738,233, despite clear differences in the claims (Application No. 09/738,233 requires that the inner conductor be electrically connected to the outer conductor, for example, while the present application does not). In an Amendment filed on September 16, 2002, Applicant explained why the rejection was improper.

In the present Office Action, the statutory double patenting rejection was withdrawn but the claims have now been rejected for obviousness-type double patenting in light of the claims of Application Number 09/738,233. The rejection has been made Final, even though it is the first appearance of such a rejection. Furthermore, the Applicant has not received an Office Action that has considered the patentability of the claims in light of the prior art. No prior art search is referred to in any Office Action and the claims have not been rejected in light of any prior art. Despite the lack of a rejection of the claims in light of the prior art, there is no indication that the claims would be allowable if a terminal disclaimer is filed to overcome the obviousness-type double patenting.

According to MPEP § 706.07, claims should not be finally rejected before their patentability has been evaluated. This section of the MPEP states that:

Before final rejection is in order a clear issue should be developed between the examiner and applicant. To bring the prosecution to as speedy conclusion as possible and at the same time to deal justly by both the applicant and the public, the invention as disclosed and claimed should be thoroughly searched in the first action and the references fully applied.....

It is respectfully submitted that after the statutory double patenting rejection was withdrawn, a prior art search should have been conducted and the present Office Action should have reflected the results of that search. The obviousness-type double patenting rejection should not have been made Final. Withdrawal of the Final Rejection pursuant to MPEP § 706.07(c) is respectfully requested.

Furthermore, the obviousness-type double patenting rejection is improper, as discussed further, below.

IV. The Obviousness-Type Double Patenting Rejection

The claims have been rejected for obviousness-type double patenting in light of the claims of Application Number 09/738,233, which require that the outer conductor be electrically connected to the inner conductor. Amended claims 1, 27 and 30, and the claims dependent upon them, have an opposite limitation, that the inner and outer electrically unconnected. Claims 1, 27 and 30 are, therefore, patentably distinct from the claims of Application Number 09/738,233. There can be no "timewise extension" of the "right to exclude". Claims 1, 27 and 30 are not, therefore, unpatentable over the claims of Application No. 09/738,233.

The Examiner has asserted that an "inductive coupling" is equivalent to an "electrical connection." It is respectfully submitted that this is incorrect. In common usage, two

distinct, separate circuits may be inductively coupled when an electromagnetic field in one circuit induces a voltage, and hence current flow, in an adjacent circuit. While one circuit interacts with the other circuit, the circuits are always distinct and separate in space. Electrically connected circuits, in contrast, form a single circuit. Inductively coupled circuits, which exhibit a transformer effect, act differently than electrically connected circuits, which do not.

Claims 1, 27 and 30, and the claims dependent upon them, require that the inner and outer conductor be electrically unconnected and inductively coupled. If the Examiner persists in asserting that electrical connection and inductive coupling are equivalent, the Examiner is requested to support this assertion.

Claim 61 recites concentric first and second coaxial cable units that lie in substantially the same plane. An example of an antenna as defined by Claim 61 is shown in Fig. 20. None of the claims of Application No. 09/728,233 recite first and second concentric coaxial cables in substantially the same plane, connected as claimed. Claim 62 is, therefore, patentably distinct from the claims of Application No. 09/738,233. Withdrawal of the rejection is respectfully requested.

Claim 62 recites a plurality of inner conductors substantially surrounded by an outer conductor. The inner conductors are connectable across at least one capacitor to tune the inner conductors to a frequency. An example of an antenna as defined by Claim 62 is shown in Figs. 29-36. None of the claims of Application No. 09/738,233 recite a plurality of inner conductors, connectable as claimed. Claim 62 and the claims dependent upon it are, therefore, patentably distinct with respect to the claims of Application No. 09/738,233. Withdrawal of the rejection is respectfully requested.

Claim 70 recites an inner conductor, a first outer conductor surrounding the inner conductor and a second outer conductor surrounding the first outer conductor. Holes are provided through the second outer conductor. An example of an antenna as defined by claim 70 is shown in Figs. 34 and 35. None of the claims of Application No. 09/738,233 recite a second outer conductor surrounding and connected to a first outer conductor, as claimed. Claim 70 and the claims dependent upon it, are therefore, patentably distinct from the claims of Application No. 09/738,233. Withdrawal of the rejection and reconsideration of the claims are respectfully requested.

V. The New Claims

New claim 86, which is dependent on independent claim 61, recites that the inner and outer conductors of the first coaxial cable unit are electrically unconnected and the inner and outer conductors of the second coaxial cable unit are electrically unconnected, as shown in Fig. 20.

New claim 87, which is dependent on independent claim 62, recites that the plurality of inner conductors are electrically unconnected to the outer conductor, as shown in Fig. 29, for example.

New claim 88, which is dependent on independent claim 70, recites that the inner conductor is electrically unconnected to the first outer conductor and to the second outer conductor, as shown in Fig. 34, for example.

New independent claim 89 defines an MRI antenna wherein an outer conductor encases an inner conductor. The inner and outer conductor are electrically unconnected. Such an antenna is shown in Figs. 1 and 3, for example. New claim 90, dependent on claim 89, recites that the inner conductor and the outer conductor each comprise a plurality of conductor

segments, wherein adjacent conductor segments are electrically connected across a capacitor.

Such a configuration is shown in Fig. 7, for example.

New claim 91, which is dependent on claim 30, recites that at least one of the first coaxial cable unit and the second coaxial cable unit define a region to receive a body part, as shown in Fig. 12, for example.

If the Final Rejection is withdrawn, as requested above, entry and consideration of the new claims are respectfully requested.

VI. Conclusion

Claims 1, 22, 30, 61, 62 and 70, the claims dependant upon them, and the new claims, are patentably distinct from the claims of Application No. 09/738,233.

In addition, none of the references in the case show or suggest an antenna comprising inductively coupled, electrically unconnected inner and outer conductors, each tuned to the same frequency during operation, as in independent claims 1, 22 and 30 and the claims dependent upon them. None of the references show or suggest concentric coaxial cables lying in the same plane and connected as in independent claim 61. None of the references show or suggest providing a plurality of inner conductors substantially surrounded by an outer conductor, as in independent claim 62 and the claims dependent upon it. None of the references show or suggest a first outer conductor surrounding an inner conductor, a second outer conductor surrounding the first outer conductor, and a plurality of holes through the second outer conductor, as in independent claim 70.

Withdrawal of the Final Rejection, entry of the Amendments and new claims, and allowance of the application are respectfully requested.

Respectfully submitted,
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Marked Up Version of the Amendments

Claims 1, 22, 27, 30, 33, 61, 62 and 70 are being amended as follows:

1. (Amended) An MRI antenna, comprising:

an inner conductor with first and second ends for being electrically connected across a capacitor to tune the inner conductor to a frequency, the first and second ends providing an output of the antenna; and

an outer conductor substantially surrounding the inner conductor, the outer conductor having first and second ends for being electrically connected across a capacitor to tune the outer conductor to the frequency;

wherein:

the inner and outer conductors [defining a region for receiving a body part and being] are inductively coupled during operation; and

the inner and the outer conductors are electrically unconnected to each other.

22. (Amended) An MRI antenna, comprising:

a coaxial cable unit comprising:

an inner conductor with first and second ends and;

an outer conductor substantially surrounding the inner conductor;

wherein:

the outer conductor and the inner conductor [being] are inductively coupled and tunable to the Larmor frequency of the species of interest during operation[.];

the inner and the outer conductors are electrically unconnected to each other; and

[wherein] the inner conductor provides an output of the antenna.

27. (Amended) An MRI antenna, comprising:

detecting means for directly detecting magnetic resonance signals emitted
by a subject;

receiving means for inductively receiving signals corresponding to the
detected magnetic resonance signals from the detecting means, and for providing received
signals for analysis, wherein the receiving means is electrically unconnected to the detecting
means; and

means for shielding the receiving means from direct detection of the
magnetic resonance signals means.

30. (Amended) An MRI antenna comprising:

a first inner conductor with first and second ends;

a first outer conductor with first and second ends, the first outer conductor
substantially surrounding the first inner conductor to form a first coaxial cable unit [defining a
region for receiving a body part], the first inner conductor and the first outer conductor being
inductively coupled during operation;

a second inner conductor with first and second ends;

a second outer conductor with first and second ends, the second outer
conductor substantially surrounding the second inner conductor to form a second coaxial cable
unit [defining a region for receiving a body part], the second inner conductor and the second
outer conductor being inductively coupled during operation;

wherein;

the inner conductors of the first and second coaxial cable units are electrically connected to form[, at least in part,] a first closed circuit tunable to a frequency[, and];

the outer conductors of the first and second coaxial cable units are electrically connected to form[, at least in part,] a second closed circuit tunable to the same frequency[,] ;

the first closed circuit is electrically unconnected to the second closed circuit; and

the output of the antenna [being] is provided from the first closed circuit comprising the inner conductors.

33. (Amended) The MRI antenna of Claim 30, further comprising:

a third inner conductor with first and second ends;

a third outer conductor with first and second ends, the third outer conductor substantially surrounding the third inner conductor to form a third coaxial cable unit defining a region for receiving a body part, the third inner conductor and the third outer conductor being inductively coupled during operation;

wherein the first closed circuit further comprises the third inner conductor of the third coaxial cable unit [is electrically connected to the first circuit] and the second closed circuit further comprises the third outer conductor of the third coaxial cable [is electrically connected to the second circuit] unit.

61. (Amended) An MRI antenna comprising:

a first inner conductor with first and second ends;

a first outer conductor substantially surrounding the first inner conductor;

the first inner conductor and the first outer conductor being inductively coupled during operation, and defining a first coaxial cable unit [defining a region for receiving a body part];

a second inner conductor and a second outer conductor substantially surrounding the second inner conductor, the second inner conductor and the second outer conductor being inductively coupled during operation, and defining a second coaxial cable unit;

wherein:

the first and second coaxial cable units are concentric and lie [in] substantially in the same plane, the second coaxial cable unit being within a region defined by the first coaxial cable unit;

the first outer conductor and the second outer conductor each have first and second adjacent ends, the first end of the first outer conductor being directly connected to the first end of the second outer conductor, the second end of the first outer conductor being directly connected to the second end of the second outer conductor, and the first end of the first outer conductor being electrically connectable to the second end of the first outer conductor across a capacitor to tune the outer conductors to a frequency;

a first end of the first inner conductor is directly electrically connected in series to a first end of the second inner conductor and a second end of the first inner conductor is directly electrically connected in series to the second end of the second inner conductor; and

the first and second ends of the second inner conductor are electrically connectable across a capacitor to tune the inner conductors to the frequency and to provide an output of the antenna.

62. (Amended) An MRI antenna comprising:

an outer conductor with first and second ends for being electrically connected across a capacitor to tune the outer conductor to a frequency; and

a plurality of inner conductors substantially surrounded by the outer conductor, the inner conductors being connectable across at least one capacitor to tune the inner conductors to the frequency, the outer conductor and the inner conductors being inductively coupled during operation;

[the inner and outer conductors defining a region for receiving a body part, where]

wherein an output of the antenna is provided from the inner conductors[, the inner conductors being electrically connected to form a circuit tunable to the frequency].

70. (Amended) An MRI antenna, comprising:

an inner conductor with first and second ends electrically connectable across a capacitor to tune the inner conductor to a frequency, the first and second ends providing an output of the antenna;

a first outer conductor substantially surrounding the inner conductor, the first outer conductor having first and second ends being electrically connected across a capacitor to tune the first outer conductor to the frequency;

a second outer conductor substantially surrounding the first outer conductor, the second outer conductor having first and second ends electrically connected across a capacitor to tune the second outer conductor to the frequency, the second outer conductors each defining a plurality of holes there through; and



the inner conductor being inductively coupled to the first outer conductor
and the first and second outer conductors [defining a region for receiving a body part and] being
inductively coupled, during operation.